CLAIMS

1. (currently amended) Rake receiver for spread spectrum signals comprising

a plurality of rake fingers each rake finger being adapted to receive a signal being part of a multipath signal and associated with a path of the multipath, said signal having a delay relative to an other signal associated with an other path of the multipath signal,

a summation unit communicatively coupled to said plurality of rake fingers for generating a summation signal based on the signals received from at least some of the rake fingers, said summation signal having an improved signal to noise ratio (SNR) if compared with the signal to noise ratio (SNR) of at least one of the rake fingers,

a timing error detector coupled to each rake finger for detecting an error of a delay (τ) of the signal of a rake finger and for generating a timing error signal which is sent to a unit for compensating the error of the respective delay (τ), and is based on the signals associated with paths of the multipath signal of more than one rake finger, wherein unit for compensating the error of the respective delay (τ) feeds signals to a detection path and to a synchronization path of each of the rake fingers, the synchronization path comprises a plurality of correlators in each of the rake fingers for a correlation of early and late signals received at each of the rake fingers, the signals being early or late with respect to signals on the detection path.

2. (canceled)

3. (currently amended) Rake receiver according to claim [[2]] 1, wherein the timing error detector generates a timing error signal based on a weighted average value of the correlated signals.

4. (previously pending) Rake receiver according to claim 3, wherein the correlation signals are generated by an adaptive finite impulse response filter and a single correlator.

5. (original) Rake receiver according to claim 4, wherein the finite impulse response filter is adaptively updated for pre-filtering the synchronization path signal for at least one rake finger such that nulls or zero-crossings are generated for the expected value of the error signal at the location of at least one other path of the multipath signal.

6. (original) Rake receiver according to claim 4, wherein the finite impulse response filter is updated adaptively for pre-filtering synchronization path signals such that a cost function is minimized for the expected value of the error signal.

7. (original) Rake receiver according to claim 6, wherein the adaptively updating is a time variant adjustment of the finite impulse response filter for pre-filtering synchronization path signals to compensate a delay (τ) of the signal of a rake finger being a time variant delay (t) of a fading multipath signal.

8. (original) Rake receiver according to claim 6, wherein the adaptively updating is a time variant adjustment of the weighted correlated signals to compensate a delay (τ) of the signal of a rake finger being a time variant delay (τ) of a fading multipath signal.

9. (original) Rake receiver according to claim 8, wherein the timing error detector is an early late gate error timing detector and early and late estimates are subtracted and multiplied with reconstructed transmitted symbols.

10. (original) Rake receiver according to claim 9 wherein the reconstructed symbols are generated by complex conjugately multiplying symbol decisions or pilot symbols with estimates of the channel phase or the channel phasor.

11. (original) Rake receiver according to claim 10 wherein the real part of the signal resulting from early and late estimate subtraction and multiplication with the reconstructed transmitted symbols is the generated error signal x.

12. (original) Rake receiver according to claim 11 wherein the error signal is fed through a loop filter with lowpass characteristic to yield an estimate E(x) for the timing delay (τ).

13. (currently amended) Method for signal processing in a rake receiver for multipath spread spectrum signals wherein the rake receiver comprises a plurality of rake fingers each rake finger being adapted to receive a signal being part of a multipath signal, comprising the steps of

associating rake fingers with a signal of a path of the multipath signal, the signal of the associated path having a delay (τ) relative to an other signal of an other path of the multipath signal,

receiving signals from the plurality of rake fingers,

generating a summation signal based on the signals received from of at least two of the rake fingers, said summation signal having an improved signal to noise ratio (SNR) relative to the signal to noise ratio (SNR) of at least one of the rake fingers,

detecting an error of a delay (τ) of a signal received from a rake finger,

generating a timing error signal which is sent to a unit for compensating the error of the respective delay (τ), the timing error signal being based on signals associated with paths of the multipath of more than one rake finger, wherein the unit for compensating the error of the respective delay (τ) feeds signals to a detection path and to a synchronization path of each of the rake fingers, and the synchronization path comprises a plurality of correlators in each of the rake fingers for a correlation of early and late signals at each of the rake fingers, the signals being early or late with respect to signals on the detection path.

14. (canceled)

15. (currently amended) Method for signal processing in a rake receiver according to claim [[14]] 13, wherein the timing error signal is generated based on a weighted average value of the correlated signals.

16. (original) Method for signal processing in a rake receiver according to claim 15, wherein the correlation signals are generated by an adaptive finite impulse response filter and a single correlator.

17. (original) Method for signal processing in a rake receiver according to claim 16, wherein the finite impulse response filter is adaptively updated for pre-filtering the synchronization path signals such that nulls or zero crossings are generated for the expected value of the error signal at the location of at least one other path of the multipath signal.

18. (original) Method for signal processing in a rake receiver according to claim 16, wherein the finite impulse response filter is adaptively updated for pre-filtering synchronization path signals such that a cost function is minimized for the expected value of the error signal.

19. (original) Method for signal processing in a rake receiver according to claim 18, wherein the adaptively updating is a time variant adjusting of said finite impulse response filter for pre-filtering synchronization path signals to compensate a delay (τ) of the signal of a rake finger being a time variant delay (t) of a fading multipath signal.

20. (currently amended) Method for signal processing in a rake receiver according to claim [[6]] 18, wherein the adaptively updating is a time variant adjustment of the weighted cross correlation signals to compensate a delay (τ) of the signal of a rake finger being a time variant delay (τ) of a fading multipath signal.

21. (original) Method for signal processing in a rake receiver according to claim 20, wherein the timing error detector is an early late gate error timing detector and early and late estimates are subtracted and multiplied with reconstructed transmitted symbols.

22. (original) Method for signal processing in a rake receiver according to claim 21, wherein the reconstructed symbols are generated by complex conjugately multiplying symbol decisions or pilot symbols with estimates of the channel phase or the channel phasor.

23. (original) Method for signal processing in a rake receiver according to claim 22, wherein the real part of the signal resulting from early and late estimate subtraction and multiplication with the reconstructed transmitted symbols is used as the generated error signal x.

24. (original) Method for signal processing in a rake receiver according to claim 23, wherein the error signal is fed through a loop filter with lowpass characteristic to yield an estimate E(x) for the timing delay (τ).